

Application No. 09/887,021
Amendment dated April 10, 2006
Reply to Office Action of January 9, 2006

Docket No.: M4065.0407/P407

REMARKS

Claims 6 and 19 have been amended. Claims 1-20, 22-33, and 35 remain pending in this application.

Claims 6 and 19 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims have been amended to provide a proper antecedent basis for the recited limitations. Withdrawal of the rejection is respectfully requested.

Claims 1-2, 5-9, 11-12, 14-16, 18-20, 24, 26-27, 29-31, and 33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Robertson et al., U.S. Patent No. 6,658,530 ("Robertson") in view of Applicant's Admitted Prior Art ("AAPA"). This rejection is respectfully traversed.

Claim 1 recites a circuit card with "a circuit element supported by the circuit card." The circuit element has "a plurality of inputs and outputs," and "a plurality of signal lines supported by the circuit card." Each signal line is "electrically connected respectively to one of said plurality of inputs or one of said plurality of outputs." A "plurality of shields [is] supported by the circuit card." The signal lines are "grouped in a plurality of adjacent corresponding pairs." A shield is "located respectively on each side of each of said plurality of corresponding pairs of said signal lines."

Robertson discloses a memory module. The memory module includes printed circuit board (PCB) 101 and a connector 102. The PCB 101 features signal traces 103 that are arranged to be as short as possible. The PCB 101 includes a power layer, an electrical ground layer, and a plurality of signal layers. Robertson does not teach or suggest a circuit card with "a plurality of shields supported by the circuit card" where

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"a plurality of signal lines supported by the circuit card" are "grouped in a plurality of adjacent corresponding pairs" and a shield is "located respectively on each side of each of said plurality of corresponding pairs of said signal lines."

Instead, Robertson teaches a grounding arrangement that involves ground pins 106 that are part of the connector 102. Robertson is silent regarding "shields supported by the circuit card," PCB 101. Consequently, Robertson teaches nothing about shields "located respectively on each side of each of [a] plurality of corresponding pairs of [circuit element] signal lines" supported on the circuit card.

The Office Action recognizes that Robertson does not "disclose shields that extend the entire length of the signal to the circuit card and supported by the circuit card." Office Action at 3. The Office Action relies on the AAPA to remedy this deficiency. Applicant respectfully submits that, absent hindsight of the present invention, one of ordinary skill in the art, following the teachings of Robertson, would not be motivated to follow the teachings of the AAPA to add shields that extend the entire length of the signal to the circuit cards, but would instead be motivated by Robertson to eliminate the shields of AAPA and simply provide ground connector pins, as Robertson teaches, to eliminate cross talk. In effect, Robertson teaches away from the present invention by his teaching that simply adding ground pins between groups of signal pins, will eliminate cross talk. Robertson's PCB 101 includes an electrical ground layer (col. 4, line 21) to which the ground pins are connected. Robertson's signal traces are not shielded at all, and Robertson does not suggest that they should be or need be shielded to eliminate cross talk. Accordingly, applicant submits that the present invention would not have been obvious to one of ordinary skill in the art.

Claims 2 and 5 depend directly from claim 1 and are patentable for at least the same reasons.

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Claim 6 recites, *inter alia*, a circuit card with "a plurality of shields supported by said circuit card." The shields are "arranged and configured on said printed circuit board to be electrically connected at a first end to respective connectors of said connector device." Each shield is "electrically connected at a second end to a respective one of said plurality of circuit element inputs or outputs." The signal lines are "grouped in a plurality of adjacent corresponding pairs," and "respective ones of said shields being located respectively on each side of each of said plurality of corresponding pairs of said signal lines."

As noted above in connection with claim 1, Robertson and the AAPA teach different ways to eliminate cross talk between signals. Robertson does not teach or suggest a "plurality of shields supported by said circuit card." Robertson does not teach "signal lines being grouped in a plurality of adjacent corresponding pairs, respective ones of said shields being located on each side of each of said plurality of corresponding pairs of said signal lines." Further, as noted above, Robertson in effect teaches away from the present invention by simply adding grounded connector pins, not shields, to eliminate cross talk.

Claim 7 depends from claim 6 and is patentable for at least the same reasons.

Claim 8 recites, in pertinent part, a circuit card having "a shield on the circuit card extending adjacent and the length of each respective signal line pair," which are "on the circuit card." As noted above in connection with claim 1, the combination of Robertson and the AAPA would not motivate one of ordinary skill to arrive at the present invention, but rather would motivate one of ordinary skill to eliminate the shields of AAPA, an important feature of the present invention. Claim 8 and its directly dependent claim 9 are patentable for at least the same reasons.

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Claim 11 recites a memory expansion card with a memory device. The memory expansion card includes, *inter alia*, "a plurality of shields on the expansion card and electrically connected to said memory device, a shield being located respectively between each pair of [a] plurality of corresponding pairs of [memory device] signal lines."

As noted above in connection with claim 1, the combination of Robertson and the AAPA would not motivate one of ordinary skill to arrive at the present invention, but rather would motivate one of ordinary skill to eliminate the shields of AAPA, an important feature of the present invention. Claim 11 and its directly dependent claims 12 and 14 are patentable for at least the same reasons.

Claim 15 recites a memory expansion card that includes "a plurality of shields supported by said expansion card and electrically connected to [a] memory device." Respective shields are "located to extend along and between each of [a] plurality of corresponding pairs of...signal lines."

As noted above in connection with claim 1, the combination of Robertson and the AAPA would not motivate one of ordinary skill to arrive at the present invention, but rather would motivate one of ordinary skill to eliminate the shields of AAPA, an important feature of the present invention. Claim 15 and directly dependent claim 16 are patentable for at least the same reasons.

Claim 18 recites a memory expansion card assembly that includes, *inter alia*, "a connector device mounted on a motherboard and having a plurality of connectors, said plurality of connectors having a first portion for conducting signals and a second portion for providing a shield, said connectors in said first portion being grouped in a plurality of corresponding pairs, a respective one of said connectors in said second

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portion being located between each of said plurality of corresponding pairs of said first portion of said plurality of connectors," "a plurality of signal lines on said expansion card being connected respectively to each of said first portion of connectors," and "a plurality of shields on said expansion card being connected respectively to each of said connectors in said second portion and extending respectively along adjacent signal lines connected to said first portion of connectors."

As noted above in connection with claim 1, the combination of Robertson and the AAPA would not motivate one of ordinary skill to arrive at the present invention, but rather would motivate one of ordinary skill to eliminate the shields of AAPA, an important feature of the present invention.

Claim 19 recites a processing system that includes, *inter alia*, "a plurality of shields supported by [a] circuit card, each shield being connected respectively to [a] circuit element, [and] signal lines being grouped in a plurality of adjacent corresponding pairs, a shield being located between respective corresponding pairs of said signal lines."

As noted above in connection with claim 1, the combination of Robertson and the AAPA would not motivate one of ordinary skill to arrive at the present invention, but rather would motivate one of ordinary skill to eliminate the shields of AAPA, an important feature of the present invention. Claim 19 and directly-dependent claims 20 and 24 are patentable for at least the same reasons.

Claim 26 recites a processing system that includes a memory expansion card with "a plurality of signal lines and a plurality of shields supported by said memory expansion card." Each of a first portion of said plurality of inputs and outputs of said memory device is "coupled to a respective signal line to receive signals from or send

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signals to respective ones of said connectors of said connector device." The signal lines are "grouped in a plurality of corresponding pairs." A shield is "located on each respective side of each of said plurality of corresponding pairs of said signal lines."

As noted above in connection with claim 1, the combination of Robertson and the AAPA would not motivate one of ordinary skill to arrive at the present invention, but rather would motivate one of ordinary skill to eliminate the shields of AAPA, an important feature of the present invention. Claim 26 and dependent claims 27 and 29 are patentable for at least the same reasons.

Claim 30 recites a processing system in which a memory expansion card a memory expansion card and "a plurality of shields supported by said expansion card and electrically connected to said memory device." A "respective one of said plurality of shields" is "located to extend along each of said plurality of corresponding pairs of [a] plurality of signal lines."

As noted above in connection with claim 1, the combination of Robertson and the AAPA would not motivate one of ordinary skill to arrive at the present invention, but rather would motivate one of ordinary skill to eliminate the shields of AAPA, an important feature of the present invention. Claim 30 and dependent claim 31 are patentable for at least the same reasons.

Claim 33 recites a "method for constructing on a circuit card a bus system device." The method includes steps of "providing a circuit element on said circuit card." The circuit element has "a first plurality of connectors for conducting bus signals" grouped "into a plurality of corresponding pairs." A second plurality of connectors provided on the circuit element is "connected to a respective shield supported on said circuit card." A respective shield extends "along each side of

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respective pairs of signal lines supported on said circuit card" and "connected to each of said corresponding pairs of said first plurality of connectors."

As noted above in connection with claim 1, the combination of Robertson and the AAPA would not motivate one of ordinary skill to arrive at the present invention, but rather would motivate one of ordinary skill to eliminate the shields of AAPA, an important feature of the present invention. Withdrawal of the rejection of claim 33 is accordingly respectfully requested.

Claims 3 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Robertson in view of the AAPA and further in view of Chin et al., U.S. Patent No. 6,216,205 ("Chin"). This rejection is respectfully traversed.

Claim 3 depends from claim 1, and claim 22 depends from claim 19. Claims 1 and 19 are submitted to be patentable over Robertson and the AAPA for the reasons advanced above. Chin does not remedy the deficiencies of Robertson and the AAPA. Chin has been cited as providing a driver to drive signals between inputs and outputs of the circuit element. However, Chin does not address the deficiency of the Examiner's proposed combination of Robertson and the AAPA – Chin does not counter Robertson's disclosure of providing only additional ground pins to reduce cross talk, effectively teaching away from the present invention.

Withdrawal of the rejection is respectfully requested and the claims allowed.

Claims 4, 10, 13, 17, 23, 28, 32, and 35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Robertson and AAPA in view of Ortega et al., U.S. Patent No. 6,257,587 ("Ortega"). This rejection is respectfully traversed.

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Claims 4, 10, 13, 17, 23, 28, and 35 depend directly from claims 1, 8, 11, 15, 19, 26, 30, and 35, respectively. Claims 1, 8, 11, 15, 19, 26, 30, and 35 are patentable over Robertson and the AAPA for the reasons advanced above. Ortega does not remedy the deficiencies of Robertson and the AAPA noted above. Accordingly, claims 4, 10, 13, 17, 23, 28, and 35 are submitted to be patentable for the reasons discussed above with respect to claims 1, 8, 11, 15, 19, 26, 30, and 35. Withdrawal of the rejection is respectfully requested.


Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Robertson in view of the AAPA and further in view of Elabd, U.S. Patent No. 6,526,462 ("Elabd"). This rejection is respectfully traversed.

Claim 25 depends directly from claim 19. Claim 19 is patentable over Robertson and the AAPA. Elabd does not remedy the deficiencies of Robertson and the AAPA which are discussed above. Accordingly, dependent claim 25 is submitted to be patentable over Robertson and the AAPA in view of Elabd for the reasons discussed above with respect to claim 19. Withdrawal of this rejection is respectfully requested.

In view of the foregoing amendment, Applicant submits that the present application is in condition for allowance, and such action is earnestly solicited.

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Respectfully submitted,

By 

Stephen A. Soffen

Registration No.: 31,063
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP
2101 L Street NW
Washington, DC 20037-1526
(202) 785-9700